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(54) **Shadow mask arrangement and method of manufacture.**

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US-A-3 398 309

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Description

The present invention provides a method of making a mask structure suitable for a colour cathode ray tube (CRT). The structure is positioned at a small distance from the phosphor screen of a CRT and the separate masks making up the structure are separated from each other, each mask being apertured and the apertures being arranged coaxially with corresponding apertures of the other masks over the entire area of the masks.

One such CRT having this type of mask structure is the mask-focusing colour picture tube. In a mask-focusing colour picture tube, different potentials are applied to the masks and an electrostatic lens is formed between the adjacent masks. The electron beam utility factor is significantly increased compared with a conventional shadow mask type colour CRT. A mask-focusing colour picture tube is described in Japanese Utility Model Publication No. 38930/1972, and U.S. Patent Nos. 2971117 and 3398309.

Another type of CRT which has the above-described mask structure is described in Japanese Patent Publication No. 1698/1980. This colour CRT has two masks. One mask acts as a colour selection electrode and the other mask acts as an electron shield for preventing the other mask from being bombarded by electron beams and from being deformed by its rising temperature resulting from that bombardment.

In both types of colour CRTs, the corresponding apertures of the masks must be aligned coaxially with the electron beams. However, it is difficult to make or assemble a plurality of masks with such high precision. In a conventional manner, each apertured flat mask is pressed into its predetermined curved shape independently from the other mask. The masks are made of thin metal plates and have a relatively large area so that they are subject to being deformed during handling in the manufacturing process. The curvature of each mask is inevitably slightly different from that of the other masks at a given position on the masks. Therefore, it is difficult to precisely align the corresponding apertures of each mask.

An object of the present invention is to provide a method of making a mask structure for a CRT, which method makes it easier to precisely align the corresponding apertures of each mask.

According to the present invention, in a method of making a mask structure suitable for a cathode ray tube, at least two flat masks each having an effective portion with a plurality of apertures therethrough and a border surrounding the effective portion are pressed into a predetermined curvature and the curved masks are subsequently arranged in spaced apart relation with corresponding apertures in alignment, characterised in that prior to pressing the flat masks they are arranged in a stack with the corresponding apertures in alignment, a force is applied to the flat masks to hold them in contact with each other, the flat masks are welded together at welding portions of the borders, the force is removed from the flat masks, the masks are pressed while welded together into the predetermined curvature and after the pressing operation the welded portions are removed from the masks to separate the masks.

Preferably, the force which is applied to the flat masks is a force generated by a magnetic field.

In order that the invention may be more readily understood, it will now be described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a cross-sectional view of a mask-focusing colour cathode ray tube;

Figure 2 is a perspective view showing one step of the fabrication method of the present invention; and

Figure 3 is a perspective view of a mask structure showing one step of the fabrication method of the present invention.

Referring now to Figure 1, there is shown a cross-sectional view showing the arrangement of a mask-focusing colour picture tube including a mask structure having two masks formed according to the present invention. A funnel 2 is joined to the outer periphery of a face plate 4, on the inner surface of which is formed a metal-backed phosphor screen 6. A neck 8 is joined to the end of funnel 2. Electron guns 10 are disposed within neck 8. A deflection apparatus 12 is mounted on the outer surfaces of funnel 2 and around neck 8. A first mask 14 is close to phosphor screen 6, and a second mask 16 is close to the mask 14 on the side thereof away from the screen. First and second masks 14 and 16 each have a plurality of apertures therein. Second mask 16 is mounted on the face plate 4 by a mask frame 18, elastic support members 20 and pins 22. First mask 14 is mounted on the second mask 16 through an insulating member 24. The metal-backed phosphor screen 6 comprises phosphor stripes of regularly alternating colours coated on the inner surface of face plate 4, and a thin metal layer formed on the phosphor stripes. A conductive film 26 is uniformly coated on the inner surface of funnel 2 and on a part of the inner surface of neck 8. Two buttons 28 and 30 are mounted on funnel 2 for applying the different voltages from outside. Button 28 is electrically connected to conductive film 26 and an elastic connector 32 connecting to mask frame 18 and the metal-backed phosphor screen layer 6 through pins 22. The other button 30 is electrically connected to first mask 14 through an elastic connector 34. The applied potential of metal-backed phosphor screen 6 and second mask 16 is slightly higher than that of first mask 14.

In the colour picture tube arrangement described above, three electron beams 36, 38 and 40 emitted from the electron guns 10, deflected by deflection apparatus 12, are selectively focused by second and first masks 16 and 14, passing through their apertures and impinging on the appropriate phosphor stripes which then emit light of the corresponding colours. Therefore, the

corresponding apertures of each mask must be arranged coaxially. The fabrication method step result in the formation of a mask structure in which the apertures are more accurately aligned than in mask structures fabricated by known techniques and which can be manufactured less expensively than by known techniques.

Referring now to Figure 2, there is shown in perspective view a step in the manufacturing process of the present invention. Two apertured flat masks 42 and 44 of magnetic material are placed on a surface plate 46 made of iron, which surface plate has a flat surface. Each of the apertured flat masks 42 and 44 includes an effective portion 48 having a plurality of slit apertures 50, a border portion 52 surrounding the effective portion 48 with welding portions 54 provided at the periphery of the border portion 52. Guide holes 53 for regulating the corresponding apertures 50 of each mask are provided at the four corners of the border portion. Guide holes 53 are adapted to locate registration pins 47 provided on surface plate 46, the corresponding apertures of each mask being arranged with high precision. However, there are formed small gaps between the flat masks 42 and 44 resulting from the deformation or the warp of the flat masks formed during handling because of their very small thickness. Under such circumstances, if the flat masks 42 and 44 were welded together and pressed into the desired curvature shape, the sliding and the non-uniform stretching of the masks would occur, resulting in the shape of the apertures being deformed and the corresponding apertures of each mask being offset.

Therefore, in the present invention, a magnetic generating apparatus 56 is provided for generating electromagnetic force through the surface plate 46. When the magnetic generating apparatus operates, the stacked apertured flat masks 42 and 44 are urged towards the surface plate and are firmly pressed together over their entire areas and the gaps between the masks are eliminated. When the flat masks are held tightly by the force, they are welded together at their respective welding portions 54 by seam welding or spot welding.

After welding the masks, the magnetic generating apparatus 56 is de-activated so as to remove the force and the welded flat masks 42 and 44 are removed from the surface plate 46. Then the welded flat masks 42 and 44 are simultaneously pressed into the desired predetermined curvature shape in the same manner of pressing as the pressing of a shadow mask of a conventional cathode ray tube.

Referring now to Figure 3, X-marks denote the welded points. After the masks are pressed to the desired shape, the welded portions 54 are cut off from masks 42 and 44 with shears or a laser beam and the masks are separated. The separated masks are arranged to form a structure by a mask frame so as to be separated from each other with a predetermined gap, as shown in Figure 1.

The two masks formed by the above-mentioned manner can be constructed into a mask structure without any distortion of apertures and any offset of the corresponding apertures of each mask.

In the embodiment shown and discussed, a strong magnetic field is effective to hold the masks tightly together to one another and to the surface plate 46. For example, for two flat masks of about 180 mm × 140 mm and 0.15 mm in thickness, more than about 500 gauss of the magnetic field at surface plate 46 is effective.

It should be understood that the present invention can be applied to the manufacture of a structure of more than two masks, even though a two mask embodiment is described. Furthermore, it should be understood that it is possible to move the stacked flat masks into the magnetic field and then remove them from the magnetic field after welding instead of actuating and de-actuating the magnetic generating apparatus.

While the invention has been described in connection with what is presently considered to be the most practical and preferred embodiments, it is to be understood that the invention is not to be limited to the disclosed embodiment but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures.

Claims

1. A method of making a mask structure suitable for a cathode ray tube in which

at least two flat masks each having an effective portion with a plurality of apertures therethrough and a border surrounding the effective portion are pressed into a predetermined curvature and the curved masks are subsequently arranged in spaced apart relation with corresponding apertures in alignment, characterised in that

prior to pressing the flat masks they are arranged in a stack with the corresponding apertures in alignment,

a force is applied to the flat masks to hold them in contact with each other,

the flat masks are welded together at welding portions of the borders,

the force is removed from the flat masks,

the masks are pressed while welded together into the predetermined curvature and after the pressing operation the welded portions are removed from the masks to separate the masks.

2. A method as claimed in claim 1, characterised in that the force which is applied to the flat masks is generated by a magnetic field.

3. A method as claimed in claim 2, characterised in that the masks are of magnetic material and are arranged in a stack, with the corresponding apertures in alignment, on a flat surface of a plate of magnetic material, and the force is applied in the direction to urge the masks towards the flat surface.

4. A method as claimed in claim 1, 2 or 3,

characterised in that the masks are spot welded together.

5. A method as claimed in claim 1, 2 or 3, characterised in that the masks are seam welded together.

6. A mask structure suitable for a cathode ray tube and manufactured by the method as claimed in any preceding claim.

7. A cathode ray tube having a mask structure as claimed in claim 6.

Patentansprüche

1. Verfahren zur Herstellung einer Maske für Katodenstrahlröhren, bei dem mindestens zwei flache Masken, die jeweils einen wirksamen Teil mit mehreren Öffnungen und einen den wirksamen Teil umschließenden Randteil aufweisen durch einen Preßvorgang in eine vorgegebene Krümmung gebogen und im Abstand zueinander angeordnet werden, wobei die jeweils zutreffenden Öffnungen genau aufeinander ausgerichtet sind und fluchten, dadurch gekennzeichnet,

daß die flachen Masken vor dem Pressen derart stapelförmig übereinander angeordnet sind, daß deren jeweiligen Öffnungen aufeinander ausgerichtet sind,

daß die flachen Masken von einer auf sie einwirkenden Kraft in Berührungskontakt gebracht werden,

daß die flachen Masken an Schweißstellen des Randteiles miteinander verschweißt werden,

daß anschließend die auf die flachen Masken einwirkende Kraft weggenommen wird,

daß die miteinander verbundenen Masken durch Pressen in die gewünschte Krümmung gebogen werden,

und daß die Schweißstellen nach dem Pressen von den Masken entfernt wird und diese voneinander getrennt werden.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die auf die flachen Masken einwirkende Kraft von einem Magnetfeld erzeugt wird.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß die aus einem Magnetwerkstoff hergestellten Masken auf der flachen Oberfläche einer ebenfalls aus Magnetwerkstoff bestehenden Platte derart gestapelt sind, daß die jeweils zutreffenden Öffnungen aufeinander ausgerichtet sind, und daß die Masken von einer Kraft auf die flache Oberfläche gedrückt werden.

4. Verfahren nach mindestens einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Masken durch Punktschweißen miteinander verbunden werden.

5. Verfahren nach mindestens einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Masken durch Nahtschweißen miteinander verbunden werden.

6. Lockmaske für Kathodenstrahlrähren, gekennzeichnet durch die Herstellung nach mindestens in einem der Ansprüche 1 bis 5 beanspruchten Verfahren.

7. Kathodenstrahlröhre, gekennzeichnet durch eine nach Anspruch 6 beanspruchte Lockmaske.

Revendications

1. Un procédé de fabrication d'une structure de masques convenant pour un tube cathodique, dans lequel

on emboutit, pour leur donner une forme prédéterminée, au moins deux masques plans ayant chacun une partie effective comportant un ensemble d'ouvertures, et un pourtour qui entoure la partie effective, et on dispose ensuite les masques courbes à distance l'un de l'autre, avec des ouvertures correspondantes en alignement, caractérisé en ce que

avant d'emboutir les masques plans, on les empile avec les ouvertures correspondantes en alignement,

on applique une force aux masques plans pour les maintenir en contact mutuel,

on soude ensemble les masques plans dans des parties de soudage des pourtours,

on supprime la force appliquée aux masques plans, on emboutit les masques pour leur donner la courbure prédéterminée, alors qu'ils sont soudés ensemble, et après l'opération d'emboutissage, on supprime les parties soudées des masques, pour séparer ces derniers.

2. Un procédé selon la revendication 1, caractérisé en ce que la force qui est appliquée aux masques plans est produite par un champ magnétique.

3. Un procédé selon la revendication 2, caractérisé en ce que les masques sont en une matière magnétique et sont empilés, avec les ouvertures correspondantes en alignement, sur une surface plane d'une plaque de matière magnétique, et on applique la force dans la direction qui applique les masques contre la surface plane.

4. Un procédé selon la revendication 1, 2 ou 3, caractérisé en ce qu'on soude les masques ensemble par soudage à la molette.

5. Un procédé selon la revendication 1, 2 ou 3, caractérisé en ce qu'on soude les masques ensemble par soudage par points.

6. Une structure de masques convenant pour un tube cathodique et fabriquée par le procédé revendiqué dans l'une quelconque des revendications précédentes.

7. Un tube cathodique ayant une structure de masques selon la revendication 6.

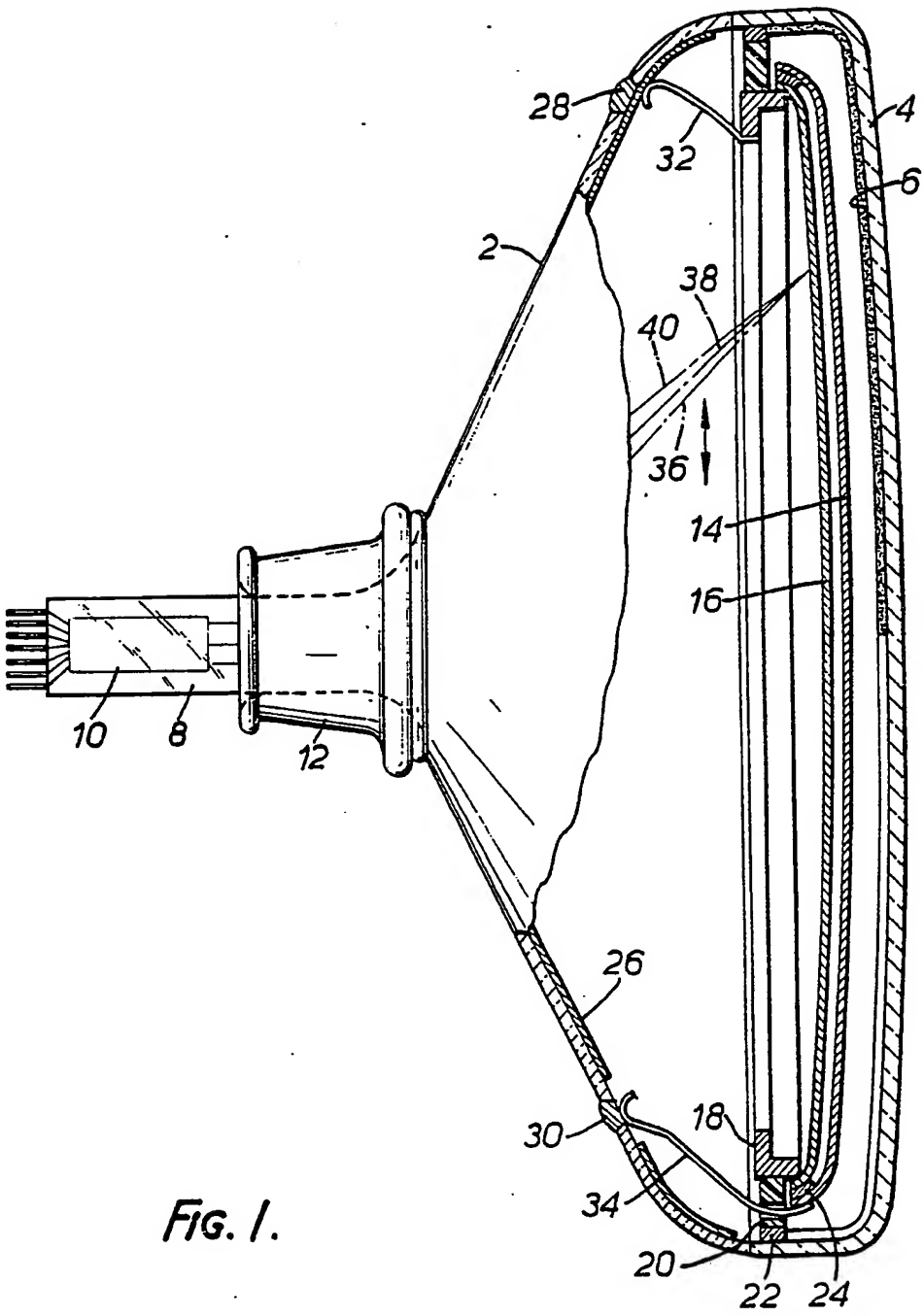

FIG. 1.

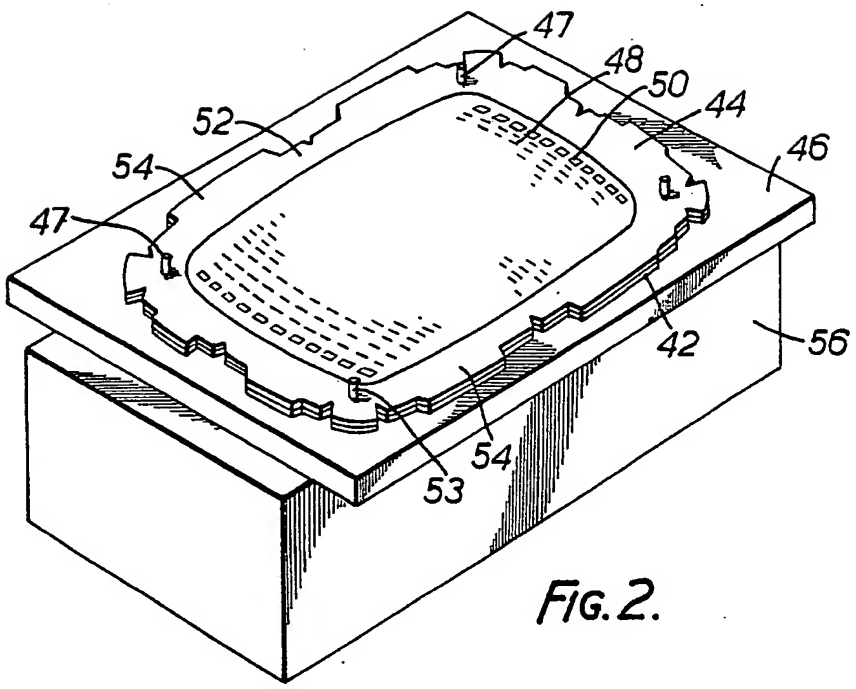

FIG. 2.

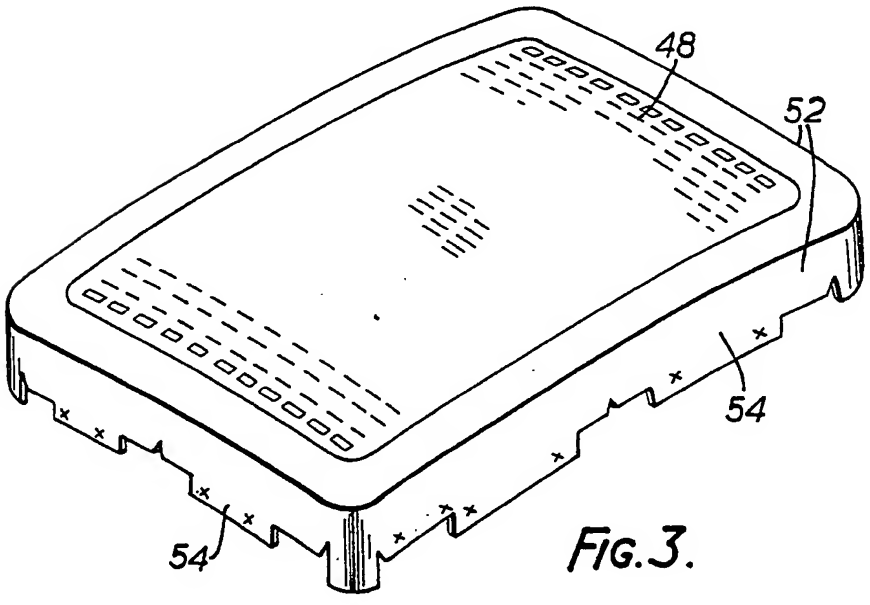

FIG. 3.

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(54) **Shadow mask arrangement and method of manufacture.**

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Description

The present invention provides a method of making a mask structure suitable for a colour cathode ray tube (CRT). The structure is positioned at a small distance from the phosphor screen of a CRT and the separate masks making up the structure are separated from each other, each mask being apertured and the apertures being arranged coaxially with corresponding apertures of the other masks over the entire area of the masks.

One such CRT having this type of mask structure is the mask-focusing colour picture tube. In a mask-focusing colour picture tube, different potentials are applied to the masks and an electrostatic lens is formed between the adjacent masks. The electron beam utility factor is significantly increased compared with a conventional shadow mask type colour CRT. A mask-focusing colour picture tube is described in Japanese Utility Model Publication No. 38930/1972, and U.S. Patent Nos. 2971117 and 3398309.

Another type of CRT which has the above-described mask structure is described in Japanese Patent Publication No. 1698/1980. This colour CRT has two masks. One mask acts as a colour selection electrode and the other mask acts as an electron shield for preventing the other mask from being bombarded by electron beams and from being deformed by its rising temperature resulting from that bombardment.

In both types of colour CRTs, the corresponding apertures of the masks must be aligned coaxially with the electron beams. However, it is difficult to make or assemble a plurality of masks with such high precision. In a conventional manner, each apertured flat mask is pressed into its predetermined curved shape independently from the other mask. The masks are made of thin metal plates and have a relatively large area so that they are subject to being deformed during handling in the manufacturing process. The curvature of each mask is inevitably slightly different from that of the other masks at a given position on the masks. Therefore, it is difficult to precisely align the corresponding apertures of each mask.

An object of the present invention is to provide a method of making a mask structure for a CRT, which method makes it easier to precisely align the corresponding apertures of each mask.

According to the present invention, in a method of making a mask structure suitable for a cathode ray tube, at least two flat masks each having an effective portion with a plurality of apertures therethrough and a border surrounding the effective portion are pressed into a predetermined curvature and the curved masks are subsequently arranged in spaced apart relation with corresponding apertures in alignment, characterised in that prior to pressing the flat masks they are arranged in a stack with the corresponding apertures in alignment, a force is applied to the flat masks to hold them in contact with each other, the flat masks are welded together at welding portions of the borders, the force is removed from the flat masks, the masks are pressed while welded together into the predetermined curvature and after the pressing operation the welded portions are removed from the masks to separate the masks.

Preferably, the force which is applied to the flat masks is a force generated by a magnetic field.

In order that the invention may be more readily understood, it will now be described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a cross-sectional view of a mask-focusing colour cathode ray tube;

Figure 2 is a perspective view showing one step of the fabrication method of the present invention; and

Figure 3 is a perspective view of a mask structure showing one step of the fabrication method of the present invention.

Referring now to Figure 1, there is shown a cross-sectional view showing the arrangement of a mask-focusing colour picture tube including a mask structure having two masks formed according to the present invention. A funnel 2 is joined to the outer periphery of a face plate 4, on the inner surface of which is formed a metal-backed phosphor screen 6. A neck 8 is joined to the end of funnel 2. Electron guns 10 are disposed within neck 8. A deflection apparatus 12 is mounted on the outer surfaces of funnel 2 and around neck 8. A first mask 14 is close to phosphor screen 6, and a second mask 16 is close to the mask 14 on the side thereof away from the screen. First and second masks 14 and 16 each have a plurality of apertures therein. Second mask 16 is mounted on the face plate 4 by a mask frame 18, elastic support members 20 and pins 22. First mask 14 is mounted on the second mask 16 through an insulating member 24. The metal-backed phosphor screen 6 comprises phosphor stripes of regularly alternating colours coated on the inner surface of face plate 4, and a thin metal layer formed on the phosphor stripes. A conductive film 26 is uniformly coated on the inner surface of funnel 2 and on a part of the inner surface of neck 8. Two buttons 28 and 30 are mounted on funnel 2 for applying the different voltages from outside. Button 28 is electrically connected to conductive film 26 and an elastic connector 32 connecting to mask frame 18 and the metal-backed phosphor screen layer 6 through pins 22. The other button 30 is electrically connected to first mask 14 through an elastic connector 34. The applied potential of metal-backed phosphor screen 6 and second mask 16 is slightly higher than that of first mask 14.

In the colour picture tube arrangement described above, three electron beams 36, 38 and 40 emitted from the electron guns 10, deflected by deflection apparatus 12, are selectively focused by second and first masks 16 and 14, passing through their apertures and impinging on the appropriate phosphor stripes which then emit light of the corresponding colours. Therefore, the

corresponding apertures of each mask must be arranged coaxially. The fabrication method step result in the formation of a mask structure in which the apertures are more accurately aligned than in mask structures fabricated by known techniques and which can be manufactured less expensively than by known techniques.

Referring now to Figure 2, there is shown in perspective view a step in the manufacturing process of the present invention. Two apertured flat masks 42 and 44 of magnetic material are placed on a surface plate 46 made of iron, which surface plate has a flat surface. Each of the apertured flat masks 42 and 44 includes an effective portion 48 having a plurality of slit apertures 50, a border portion 52 surrounding the effective portion 48 with welding portions 54 provided at the periphery of the border portion 52. Guide holes 53 for regulating the corresponding apertures 50 of each mask are provided at the four corners of the border portion. Guide holes 53 are adapted to locate registration pins 47 provided on surface plate 46, the corresponding apertures of each mask being arranged with high precision. However, there are formed small gaps between the flat masks 42 and 44 resulting from the deformation or the warp of the flat masks formed during handling because of their very small thickness. Under such circumstances, if the flat masks 42 and 44 were welded together and pressed into the desired curvature shape, the sliding and the non-uniform stretching of the masks would occur, resulting in the shape of the apertures being deformed and the corresponding apertures of each mask being offset.

Therefore, in the present invention, a magnetic generating apparatus 56 is provided for generating electromagnetic force through the surface plate 46. When the magnetic generating apparatus operates, the stacked apertured flat masks 42 and 44 are urged towards the surface plate and are firmly pressed together over their entire areas and the gaps between the masks are eliminated. When the flat masks are held tightly by the force, they are welded together at their respective welding portions 54 by seam welding or spot welding.

After welding the masks, the magnetic generating apparatus 56 is de-activated so as to remove the force and the welded flat masks 42 and 44 are removed from the surface plate 46. Then the welded flat masks 42 and 44 are simultaneously pressed into the desired predetermined curvature shape in the same manner of pressing as the pressing of a shadow mask of a conventional cathode ray tube.

Referring now to Figure 3, X-marks denote the welded points. After the masks are pressed to the desired shape, the welded portions 54 are cut off from masks 42 and 44 with shears or a laser beam and the masks are separated. The separated masks are arranged to form a structure by a mask frame so as to be separated from each other with a predetermined gap, as shown in Figure 1.

The two masks formed by the above-mentioned manner can be constructed into a mask structure without any distortion of apertures and any offset of the corresponding apertures of each mask.

In the embodiment shown and discussed, a strong magnetic field is effective to hold the masks tightly together to one another and to the surface plate 46. For example, for two flat masks of about 180 mm × 140 mm and 0.15 mm in thickness, more than about 500 gauss of the magnetic field at surface plate 46 is effective.

It should be understood that the present invention can be applied to the manufacture of a structure of more than two masks, even though a two mask embodiment is described. Furthermore, it should be understood that it is possible to move the stacked flat masks into the magnetic field and then remove them from the magnetic field after welding instead of actuating and de-actuating the magnetic generating apparatus.

While the invention has been described in connection with what is presently considered to be the most practical and preferred embodiments, it is to be understood that the invention is not to be limited to the disclosed embodiment but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures.

Claims

1. A method of making a mask structure suitable for a cathode ray tube in which

at least two flat masks each having an effective portion with a plurality of apertures therethrough and a border surrounding the effective portion are pressed into a predetermined curvature and the curved masks are subsequently arranged in spaced apart relation with corresponding apertures in alignment, characterised in that

prior to pressing the flat masks they are arranged in a stack with the corresponding apertures in alignment,

a force is applied to the flat masks to hold them in contact with each other,

the flat masks are welded together at welding portions of the borders,

the force is removed from the flat masks,

the masks are pressed while welded together into the predetermined curvature and after the pressing operation the welded portions are removed from the masks to separate the masks.

2. A method as claimed in claim 1, characterised in that the force which is applied to the flat masks is generated by a magnetic field.

3. A method as claimed in claim 2, characterised in that the masks are of magnetic material and are arranged in a stack, with the corresponding apertures in alignment, on a flat surface of a plate of magnetic material, and the force is applied in the direction to urge the masks towards the flat surface.

4. A method as claimed in claim 1, 2 or 3,

characterised in that the masks are spot welded together.

5. A method as claimed in claim 1, 2 or 3, characterised in that the masks are seam welded together.

6. A mask structure suitable for a cathode ray tube and manufactured by the method as claimed in any preceding claim.

7. A cathode ray tube having a mask structure as claimed in claim 6.

Patentansprüche

1. Verfahren zur Herstellung einer Maske für Katodenstrahlröhren, bei dem mindestens zwei flache Masken, die jeweils einen wirksamen Teil mit mehreren Öffnungen und einen den wirksamen Teil umschließenden Randteil aufweisen durch einen Preßvorgang in eine vorgegebene Krümmung gebogen und im Abstand zueinander angeordnet werden, wobei die jeweils zutreffenden Öffnungen genau aufeinander ausgerichtet sind und fluchten, dadurch gekennzeichnet,

daß die flachen Masken vor dem Pressen derart stapelförmig übereinander angeordnet sind, daß deren jeweiligen Öffnungen aufeinander ausgerichtet sind,

daß die flachen Masken von einer auf sie einwirkenden Kraft in Berührungskontakt gebracht werden,

daß die flachen Masken an Schweißstellen des Randteiles miteinander verschweißt werden,

daß anschließend die auf die flachen Masken einwirkende Kraft weggenommen wird,

daß die miteinander verbundenen Masken durch Pressen in die gewünschte Krümmung gebogen werden,

und daß die Schweißstellen nach dem Pressen von den Masken entfernt wird und diese voneinander getrennt werden.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die auf die flachen Masken einwirkende Kraft von einem Magnetfeld erzeugt wird.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß die aus einem Magnetwerkstoff hergestellten Masken auf der flachen Oberfläche einer ebenfalls aus Magnetwerkstoff bestehenden Platte derart gestapelt sind, daß die jeweils zutreffenden Öffnungen aufeinander ausgerichtet sind, und daß die Masken von einer Kraft auf die flache Oberfläche gedrückt werden.

4. Verfahren nach mindestens einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Masken durch Punktschweißen miteinander verbunden werden.

5. Verfahren nach mindestens einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Masken durch Nahtschweißen miteinander verbunden werden.

6. Lockmaske für Kathodenstrahlrähren, gekennzeichnet durch die Herstellung nach mindestens in einem der Ansprüche 1 bis 5 beanspruchten Verfahren.

7. Kathodenstrahlröhre, gekennzeichnet durch eine nach Anspruch 6 beanspruchte Lockmaske.

Revendications

1. Un procédé de fabrication d'une structure de masques convenant pour un tube cathodique, dans lequel

on emboutit, pour leur donner une forme prédéterminée, au moins deux masques plans ayant chacun une partie effective comportant un ensemble d'ouvertures, et un pourtour qui entoure la partie effective, et on dispose ensuite les masques courbes à distance l'un de l'autre, avec des ouvertures correspondantes en alignement, caractérisé en ce que

avant d'emboutir les masques plans, on les empile avec les ouvertures correspondantes en alignement,

on applique une force aux masques plans pour les maintenir en contact mutuel,

on soude ensemble les masques plans dans des parties de soudage des pourtours,

on supprime la force appliquée aux masques plans, on emboutit les masques pour leur donner la courbure prédéterminée, alors qu'ils sont soudés ensemble, et après l'opération d'emboutissage, on supprime les parties soudées des masques, pour séparer ces derniers.

2. Un procédé selon la revendication 1, caractérisé en ce que la force qui est appliquée aux masques plans est produite par un champ magnétique.

3. Un procédé selon la revendication 2, caractérisé en ce que les masques sont en une matière magnétique et sont empilés, avec les ouvertures correspondantes en alignement, sur une surface plane d'une plaque de matière magnétique, et on applique la force dans la direction qui applique les masques contre la surface plane.

4. Un procédé selon la revendication 1, 2 ou 3, caractérisé en ce qu'on soude les masques ensemble par soudage à la molette.

5. Un procédé selon la revendication 1, 2 ou 3, caractérisé en ce qu'on soude les masques ensemble par soudage par points.

6. Une structure de masques convenant pour un tube cathodique et fabriquée par le procédé revendiqué dans l'une quelconque des revendications précédentes.

7. Un tube cathodique ayant une structure de masques selon la revendication 6.

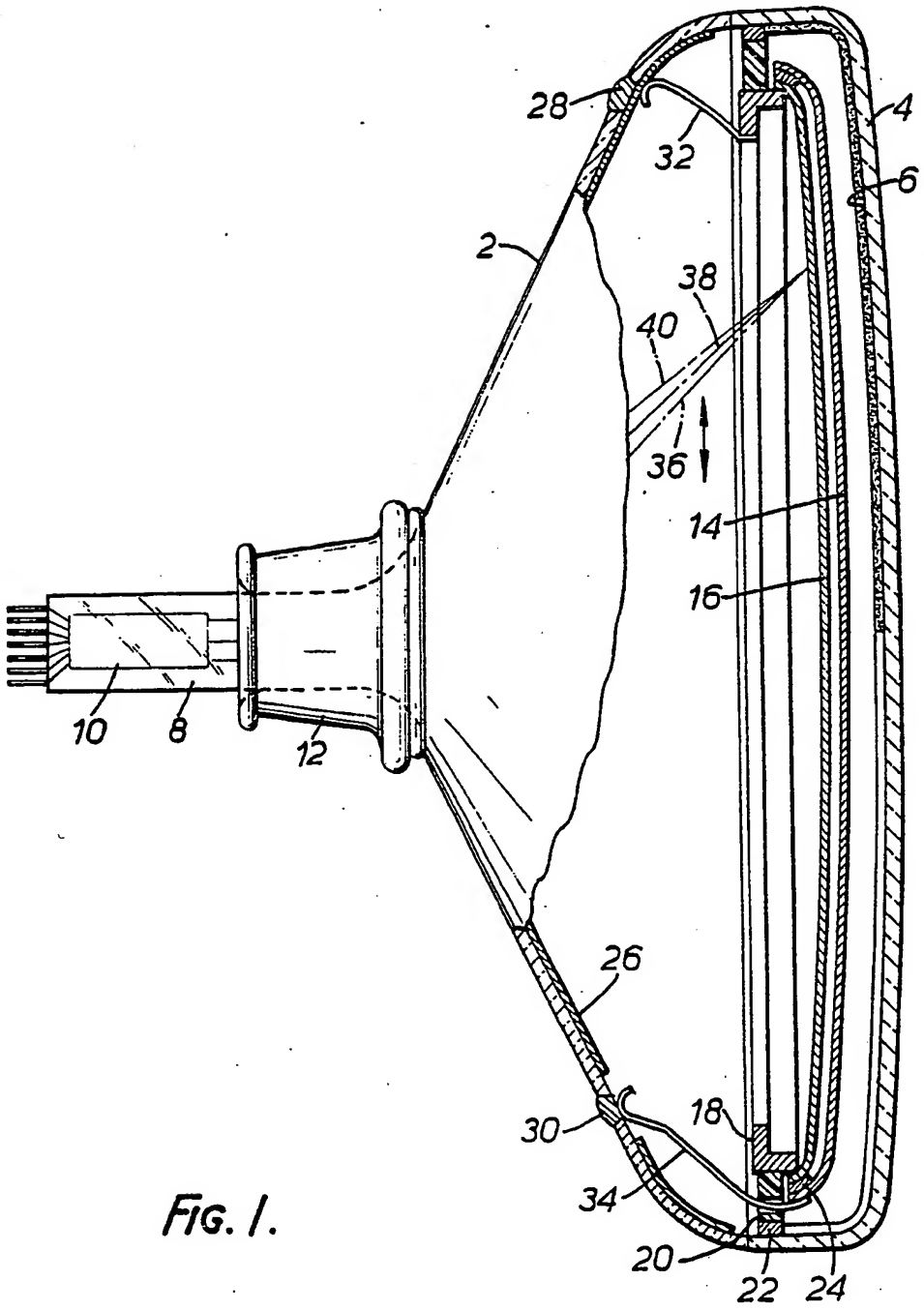

FIG. 1.

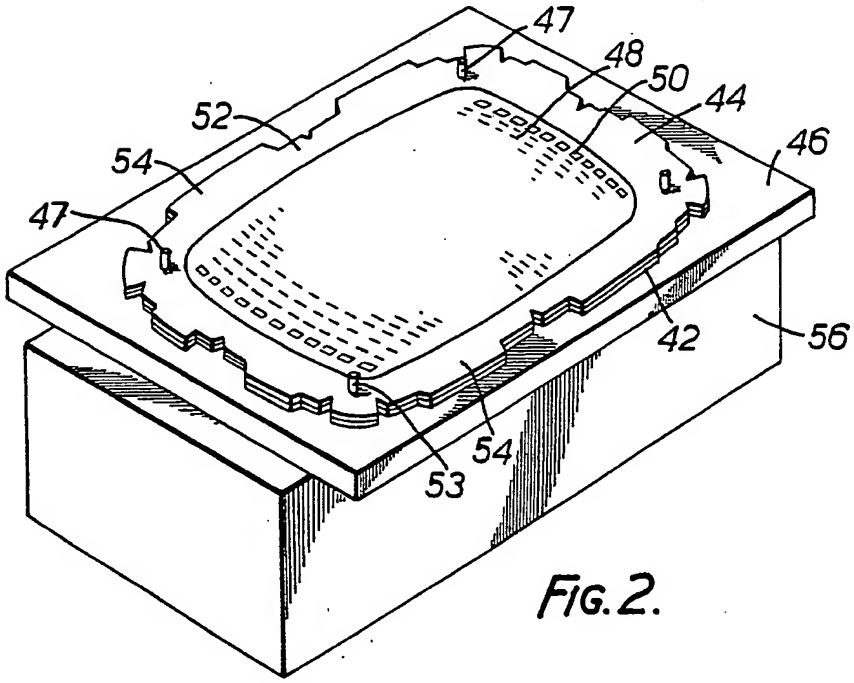

FIG. 2.

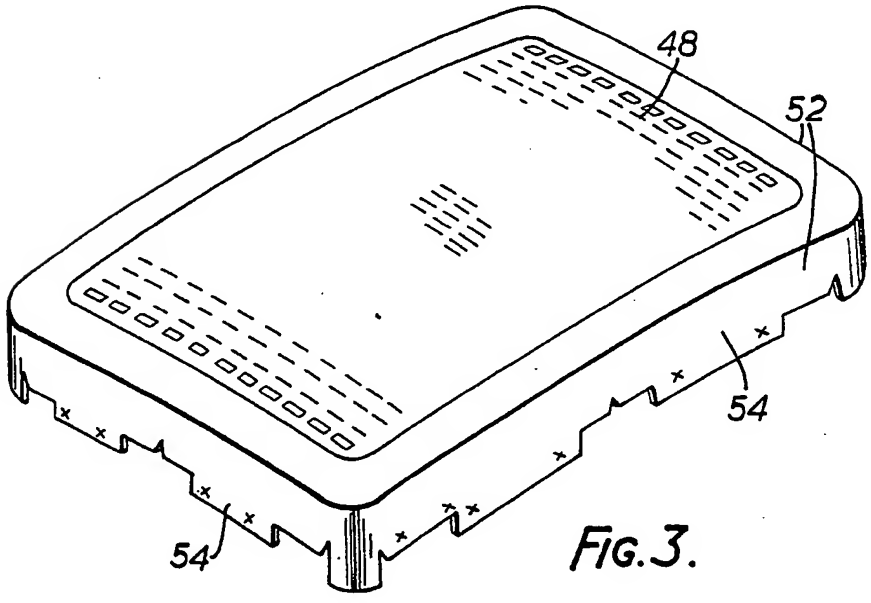

FIG. 3.